Threat Analysis of Voting Systems

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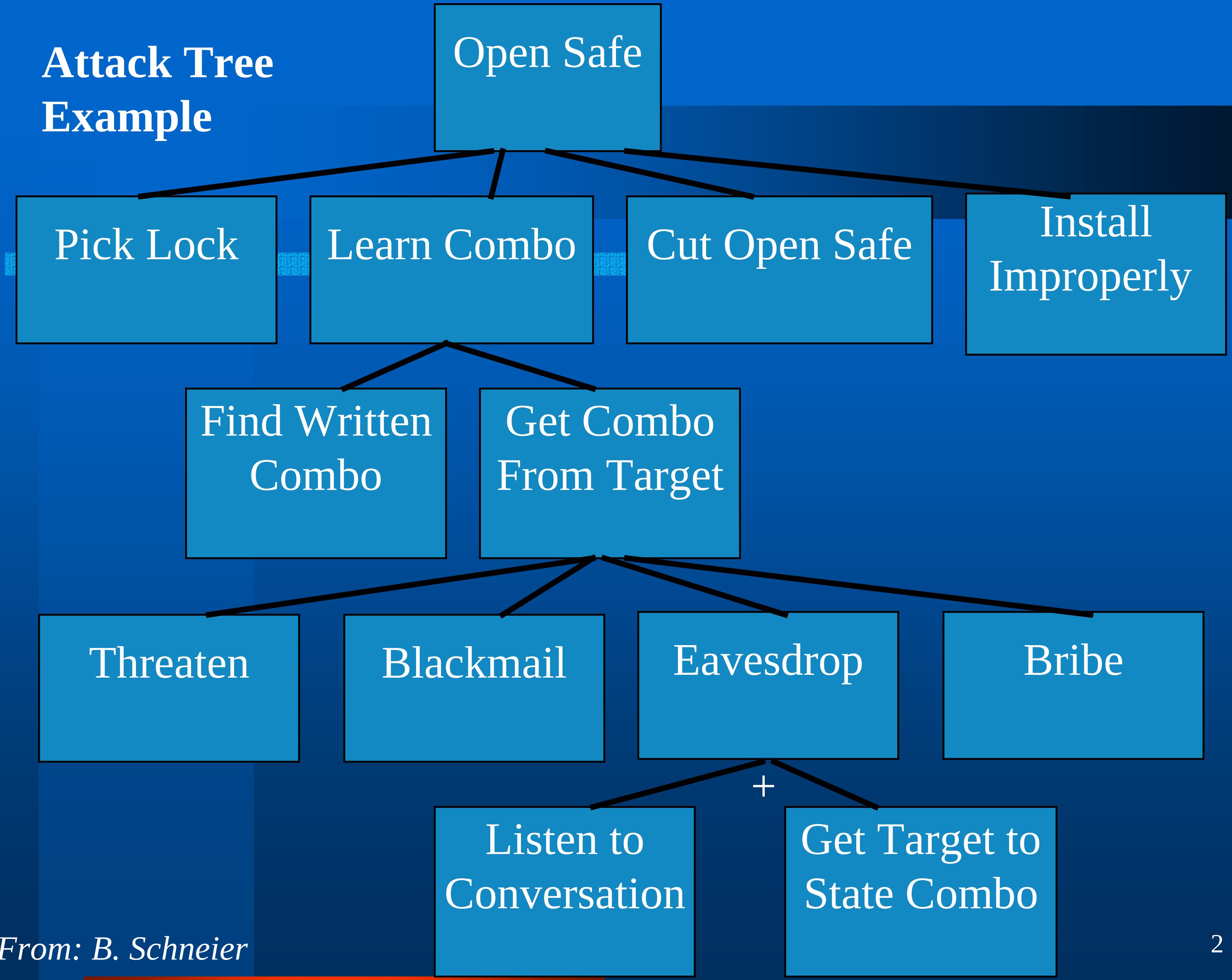
Attack Tree Example



Open Safe

Pick Lock

Learn Combo

Cut Open Safe

Install Improperly

Find Written Combo

Get Combo From Target

Threaten

Blackmail

Eavesdrop

Bribe

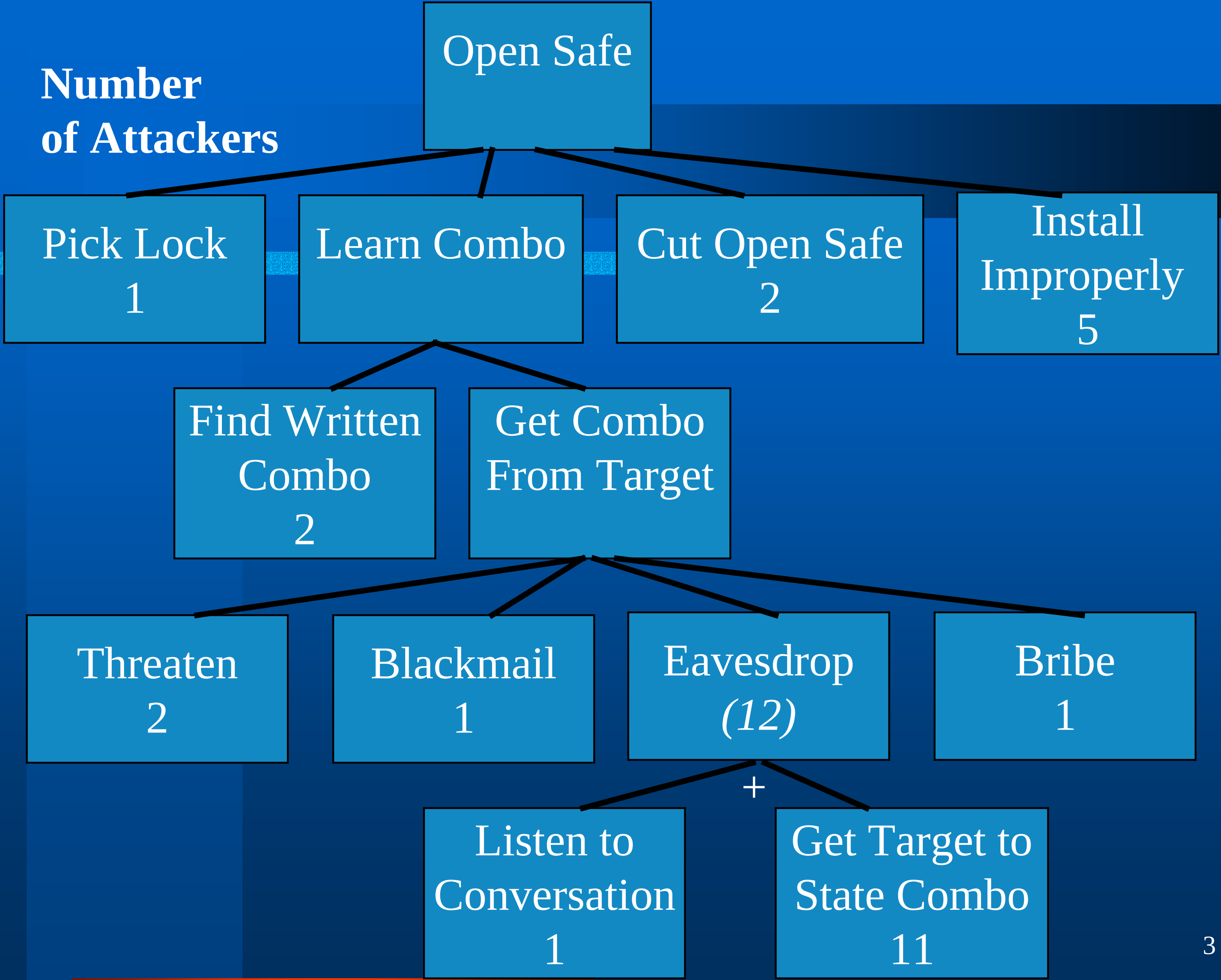
+

Listen to Conversation

Get Target to State Combo

From: B. Schneier

Number of Attackers



Open Safe

Pick Lock
1

Learn Combo

Cut Open Safe
2

Install Improperly
5

Find Written Combo
2

Get Combo From Target

Threaten
2

Blackmail
1

Eavesdrop
(12)

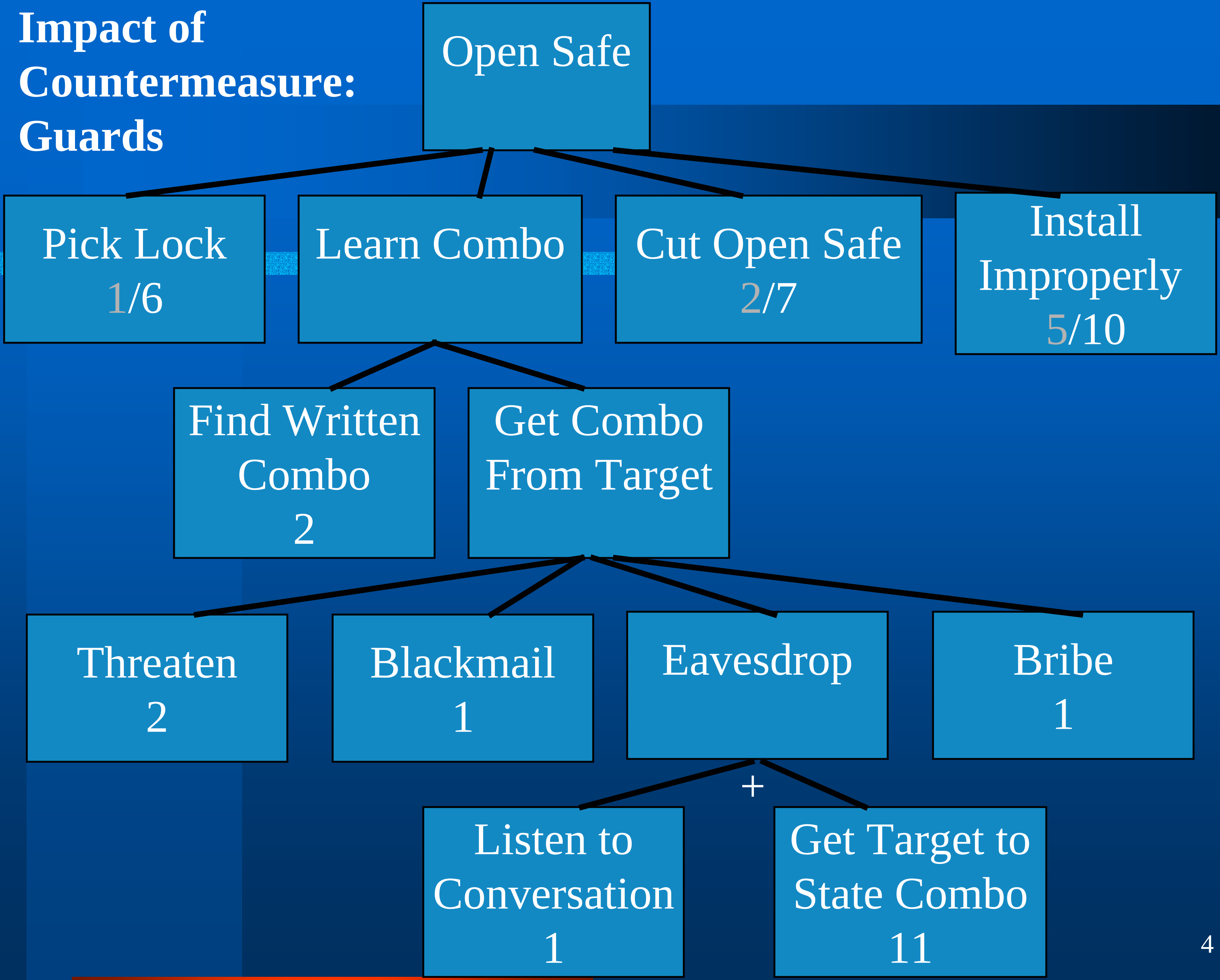
Bribe
1

+

Listen to Conversation
1

Get Target to State Combo
11

Impact of Countermeasure: Guards



Open Safe

Pick Lock
1/6

Learn Combo

Cut Open Safe
2/7

Install Improperly
5/10

Find Written Combo
2

Get Combo From Target

Threaten
2

Blackmail
1

Eavesdrop

Bribe
1

+

Listen to Conversation
1

Get Target to State Combo
11

Other Possible Approaches

- – Measure complexity of the “trusted computing base”
- – Count number of points of vulnerability
- – Measure compliance with accepted security practices
- – Measure how well technology has incorporated NIST Risk Assessment Technical Controls

Attack Team Size as Metric

- Options
  - Cost ($)
  - Elapsed time
  - Total attack team size
  - Co-opted insiders (outsiders are easy to get)

Assumed Jurisdiction/Election

- **Goal: Changing outcome of significant election**
- **Analysis requires**
  - **Which races?**
  - **How close is the attacked race?**
  - **How many votes are targeted?**
  - **How many poll workers per polling place?**
  - **How many polling places are there?**
- **In future, custom analysis**

Which Systems Examined?

- Technology types:
  - DRE
  - DRE with VVPT
  - PCOS
  - BMD
- Selected because common and available in 2006
- Cryptographic systems, witness systems amenable to methodology

Conclusion

- **Feedback on Specific Attacks**
- **Feedback on our Method**